Early Detection of Crop Stress by Drone Hyperspectral Imaging of Community Farmland in Southeast Florida

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This study examines the ability and effectiveness of drone-hyperspectral imaging in identifying variations in crop health for the purpose of optimizing farm productivity and yield. The research question guiding this study is: “Can Drone-Hyperspectral imaging be utilized to identify and differentiate variations in crop health, and to what effectiveness can it do so?” Hyperspectral imaging measures light reflectance across numerous narrow wavelength bands, effectively identifying physiological traits of crops. Higher reflectance is associated with greater chlorophyll content, biomass content, nutrient content, and water content- all indicators of healthier plants. The ability to analyze these characteristics by measuring reflectance allows for a comprehensive comparative assessment of plant health. In this study, images of community farmland in Southeast Florida were taken and analyzed. The results indicate that Drone-Hyperspectral imaging can be utilized to identify differences in plant health. At the site visited for this project, noticeable variations in the health of green pepper plants were evident. Drone-Hyperspectral imaging was found to not only differentiate these variations but also to do so effectively. These findings underscore the significance of employing innovative technology in agriculture and the resulting benefits it offers. Furthermore, they emphasize the potential of Drone-Hyperspectral imaging to improve farm productivity and yield, thereby enhancing the efficiency and sustainability of agricultural practices. By easily and efficiently identifying unhealthier plants, farmers can care and treat those plants, improving the overall health and therefore efficiency and productivity of farms and the agricultural sector as a whole.

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